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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ROSENBERGER, FREDERICK F

ART UNIT PAPER NUMBER

2884

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/765,909	Applicant(s) UMEGAKI ET AL.	
	Examiner Frederick F. Rosenberger	Art Unit 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/29/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. Figure 2C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "26" has been used to designate both a bed (page 14, line 26) and a head (page 8, line 19).
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "20" has been used to designate both protrusions (page 15, line 26) and a guide groove (page 15, line 27).

5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

7. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

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The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The present abstract is too long.

8. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: "so as to intensities of transmitted X-rays" (page 2, line 25); "herfeinbelow" (page 8, line 5); "of gamma-rays in at the shield members" (page 9, line 11); "source and the collimator is..." (page 9, line 15); "shied" (page 10, line 24); "upon by" (page 11, line 2); "cross-sectionals" (page 11, line 9); "four times larges as that..." (page 11, line 17); "10." (page 12, line 6); "Projections 52 formed being projected" (page 15, line 20); "sped" (page 18, line 5); "gauss" (page 19, line 27); "filer" (page 20, line 23). The above list is not meant to be exhaustive but only illustrative of the errors found in the specification.

Claim Objections

9. Claims 1, 4, 5, 10, 11, 13, and 17 are objected to because of the following informalities:

In claim 1, line 10, "passage" should be --passages--.

In claim 1, lines 10-11, "the crossing direction" should be --said direction crossing the center axis of each of the plurality of radiation passages-- for proper antecedent basis.

In claim 1, line 11, the recitation of "that" lacks proper antecedent basis. For the purposes of this Office action, "that" is interpreted to refer to the cross-sectional area.

In claim 1, line 12, "that direction" should be --said direction--.

In claim 4, line 3, the recitation of "the radiation detecting device" lacks proper antecedent basis.

In claim 5, line 4, the recitation of "the radiation detecting device" lacks proper antecedent basis.

In claim 10, line 3, the recitation of "the radiation detecting device" lacks proper antecedent basis.

In claim 11, line 4, the recitation of "the radiation detecting device" lacks proper antecedent basis.

In claim 13, line 13, "of" should be --prolonged from--.

In claim 13, lines 19-20, "the crossing direction" should be --said direction crossing the center axis of each of the plurality of radiation passages-- for proper antecedent basis.

In claim 13, line 20, the recitation of "that" lacks proper antecedent basis. For the purposes of this Office action, "that" is interpreted to refer to the cross-sectional area.

In claim 13, line 21, "that direction" should be --said direction--.

In claim 17, line 5, "provided each for each" should be --provided for each-

-.

In claim 18, line 10, "passage" should be --passages--.

In claim 18, line 11, "the crossing direction" should be --said direction crossing the center axis of each of the plurality of radiation passages-- for proper antecedent basis.

In claim 18, line 11, the recitation of "that" lacks proper antecedent basis. For the purposes of this Office action, "that" is interpreted to refer to the cross-sectional area.

In claim 18, line 12, "that direction" should be --said direction--.

Appropriate correction is required.

10. Claim 8 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 2. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 7, 9-12, and 19-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recited the limitation that the detectors are "faced" to the respective radiation passages of the collimator (line 10). It is unclear what applicant intends to convey by describing the detectors as faced to the passages. It has been interpreted for the purposes of this Office action that the radiation detectors are intended to face the radiation passages of the collimator such that the detection surface of each detector is perpendicular to the axis of the radiation passage, as illustrated in Figure 2C.

Claim 19 recites the limitation of a radiographic inspection method (line 1) for use with a radiographic inspection device, but fails to set forth any steps of the method.

The balance of the claims is rejected as being dependent upon independent claims 7 and 19.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 1-12 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US Patent # 6,762,413).

Zeng discloses a slat-collimated gamma camera for radiographic inspection, comprising a collimator **100** (Figure 8) with a plurality of radiation passages **104** defined by slats **102**, a plurality of radiation detectors **106**, facing the radiation passages **104**, for detecting radiation passing through the passages **104**, wherein the cross-section of the radiation passage **104** in the plane parallel to the face of the detectors is greater than the cross-section of the detectors **106** in the same plane (see Figures 4 and 8). A control device, in the form of a motor drive **134**, in cooperation with a motor **136**, enables rotation of the detector/collimator subassembly around axis **109** (Figure 3; column 6, lines 24-30).

Although Zeng doesn't specifically disclose motion of the detector and collimator in a direction crossing the center axis of each of the radiation passages, rotation of the subassembly about an axis parallel to the center axis of the radiation passages would

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meet this limitation, as during the rotation, the motion would cross the center axis of the passages.

With regards to claims 2, 4, 8, 10, and 20-22, Zeng further discloses that the device can be used in a positron emission tomography (PET) or single photon emission computed tomography (SPECT) system (column 1, lines 10-18), wherein a gantry setup can be used to rotate the detector **23** around a bed **10** supporting a patient (Figure 1).

With regards to claims 5, 6, 11, and 12, Zeng discloses that the collimator is attached directly to the detector and not to the presently claimed pair of holding members. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the collimator separate from the detector, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. Further, since the collimator needs to be larger than the detector to prevent any stray radiation from reaching the detector and since the collimator is to be held by the holding members, it would obviously follow that the radiation detectors would be located between the holding members.

16. Claims 1-3, 5-9, 11-13, 15-19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boxen (US Patent # 6,353,227) in view of Hoheisel et al. (US patent # 6,778,632).

Boxen discloses an apparatus and method for a dynamic collimator for use with a gamma camera, comprising a collimator **10** (Figure 1a) with a plurality of radiation

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passages **15**, a plurality of radiation detectors facing the radiation passages **15**, represented generally by gamma camera **11a**, wherein the gamma camera could comprise a plurality of scintillating optical fibers **19** (Figure 1b), for detecting radiation passing through the passages **15**, and a moving device **18** for moving the collimator relative to the detector (column 5, lines 41-45) perpendicular to the axis of the radiation passages **15** and parallel to the detection face of the gamma camera **11a**. Although Boxen discusses the scenario when the radiation passages **15** are larger than the detection areas of the scintillating optical fibers (column 6, lines 24-37), Boxen does not specifically disclose that the cross-section of the passages are greater than the cross-section of the detector elements in the plane parallel to the direction of motion.

Hoheisel et al. teach that a gamma detector and collimator arrangement wherein the cross-section of the collimator in the plane parallel to the face of the detector is larger than the cross-section of the detectors in the same plane (Figure 5). Hoheisel et al. teach that this arrangement results in increased transparency for the primary radiation and thus a greater signal strength (column 4, lines 25-29). Further, such a collimator can be more easily manufactured while minimizing interference patterns (column 7, lines 14-20).

Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to use a collimator with radiation passages with a cross-section greater than the cross-section of the individual detectors in a plane parallel to the direction of motion of the collimator to allow for increased transparency of

primary radiation while also providing a more easily manufactured collimator, as taught by Hoheisel et al.

With regards to claims 2, 8, 21, and 22, Boxen discloses the use of the collimator in SPECT imaging (column 10, line 64 – column 11, line 1).

With regards to claims 3 and 9, although not specifically disclosed by Boxen, a control device would be necessary to control the motor means **18** so as to provide controlled uniform motion over a given period of time to allow adequate photon sampling (column 5, lines 41-45).

With regards to claim 13, Boxen additionally discloses motion of the collimator such that the radiation passage progresses from position **1** to position **2** to position **3** and to position **4** before returning to position **1** (Figure 4; column 8, lines 31-49). As already discussed, Boxen teaches that the diameter **d** of the radiation passages may be equivalent or larger than the detector width (column 6, lines 24-37). Thus, in motion steps of distance **d** (column 7, lines 44-51), the collimator would be moved from one side surface of the radiation detector to another side surface of the radiation detector.

With regards to claims 5, 6, 11, 12, 15, and 16, Boxen is silent with regards to how the collimator is held. However, some type of holding member is required in order to locate the collimator in front of the detector and allow it to move according to motion supplied by the motor means. Given the geometry of the collimator shown in Figure 1, it would have been obvious to use a pair of holding members since using a single holding member would result in a cantilevered and flimsy structure. Further, the use of more than two holding members would add only marginal rigidity while complicating

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unidirectional motion. Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to use a pair of holding members to provide sufficient rigidity for displacing the collimator relative to the detector. Since the collimator needs to be larger than the detector to prevent any stray radiation from reaching the detector and since the collimator is to be held by the holding members, it would obviously follow that the radiation detectors would be located between the holding members.

With regards to claim 17, although Boxen do not discuss signal-processing devices being provided for each detector, Boxen do disclose the use of scintillating fibers in the detection of gamma rays. It is common knowledge in the art that scintillator detectors emit light, which is detected by a photodetector, whose analog output is indicative of the intensity of the incident gamma radiation. In order to process the analog output into an image, signal processing is required to transform the analog output into a digital signal for computer manipulation into a tomogram. Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to use signal processing devices for each detector since it was known in the art that such devices are necessary for image processing of the detected signal.

17. Claims 4, 10, 14, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boxen and Hoheisel et al., as applied to claims 1, 7, 13, and 19 above, and further in view of Zeng (US Patent # 6,762,413).

The combination of Boxen and Hoheisel et al. discloses all the limitations of parent claims 1, 7, 13, and 19, as discussed above. However, Boxen and Hoheisel are both silent with regards to a rotating device for rotating the inspection system around a bed on which a person to be examined is laid.

Zeng teaches a tomographic apparatus employing a gantry setup to rotate the detector **23** around a bed **10** supporting a patient (Figure 1). Zeng goes on to teach that the rotation of the detectors around the patient allows the monitoring of radiation for a plurality of directions (column 5, line 44-55). This plurality of views can then be used to generate a 3-D image of the detected radiation from a radiopharmaceutical in the patient instead of the standard 2-D view afforded by a planar motion detector.

Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to use a gantry system to rotate the detector around the patient so as to obtain a 3-D view of the radiation instead of a 2-D view, as taught by Zeng.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jeanguillaume (US Patent # 5,448,073) discloses a collimator with a cross-section greater than the resolution of the detectors, wherein the collimator is configured to rotate around an axis perpendicular to the plane of the detector as shown in Figure 8.


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19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick F. Rosenberger whose telephone number is 571-272-6107. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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